REMARKS

Objections to the Specification

The Examiner has objected to the abstract of the disclosure, stating that the current abstract exceeds 150 words. The Applicant has amended the abstract so that it does not exceed 150 words.

The Examiner has also stated that the title of the invention is not descriptive in view of the current invention. Applicant has amended the title to be more descriptive. Applicant respectfully submits that the amended title is descriptive of the current invention.

The Examiner has also stated that Figure 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. Along with this Amendment, the Applicant is submitting a Replacement Sheet for Figure 2, with a legend indicating that the figure represents prior art.

The Examiner has also objected to claims 2, 3 and 6, stating that the claims fail to present the claims in the manner indicated by section 608 of the MPEP. Specifically, the Examiner emphasized that "Where a claim sets forth a plurality of elements or steps, each element or step of the claim should be separated by a line indentation. There may be plural indentations to further segregate subcombinations or related steps." Applicant has amended claims 2, 3 and 6, separating elements or steps by line indentations.

The Examiner has also objected to claims 7 and 8 under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. The Examiner further wrote as follows:

> As best understood by examiner claim 7 discloses count value returned is between the last timer event and next timer event. Claim 8 disclose the count value returned is between the last timer event and next timer event where the count value is proportional to last timer event and next timer event in actual time. Both these represent same limitation as proportionality is understood because the virtual time is proportional to the actual timer (being provided by hardware clock).

Applicant respectfully submits that it is improper to read a limitation of proportionality into claim 7. Applicant submits that the language of claim 7 does not suggest proportionality, and that the description in the specification does not require or suggest any such reading. In fact, based on the specification, if multiple virtual machines, for example, operate on the same system hardware in a time-sharing arrangement, prior art virtualization implementations may not provide the proportionality of claim 8, because there will be time slices in which a given VM is not allowed to execute. If a VM is not allowed to execute during a time slice that occurs either (a) between a most recent preceding timer event and an attempt to read a count value from a virtual timer or (b) between an attempt to read a count value from a virtual timer and the next timer event, then prior art virtualization implementations may not satisfy the proportionality of claim 8.

Applicant respectfully submits that all of the Examiner's objections to the specification have either been overcome or traversed.

Claim Rejections

Rejections Under 35 U.S.C. 112

The Examiner has rejected claims 1-29 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

Regarding claim 1, the Examiner wrote:

> The claims uses relative terminology that implies virtual timer events "would occur" as they do in the physical computer system, however there is no indication how that is ensured making the claim indefinite.

Applicant has amended claim 1, replacing this so-called "relative terminology" with other terminology, which Applicant submits is in compliance with 35 U.S.C. 112, second paragraph.

Regarding claims 2 and 3, the Examiner wrote:

> Claim 2 discloses limitation "the average rate of timer events in the virtual computer system is substantially the

same as the average rate at which timer events would be generated in a physical computer system", where the limits or bounds of the "substantially" are unclear. Further, the claims uses relative terminology (would be) that implies virtual timer events would be occurring as they do in the physical computer system, however there is no indication how that is ensured making the claim indefinite.
Claim 3 suffers from the same deficiencies as above and is rejected likewise.

Applicant respectfully submits that the limitation to "the average rate of timer events in the virtual computer system is substantially the same as the average rate at which timer events would be generated in a physical computer system" is sufficiently definite because one of ordinary skill in the art would know what is meant by "substantially the same," especially in view of the description in the specification. Please see section 2173.05(b) of the MPEP.

Applicant has amended claims 2 and 3, replacing the so-called "relative terminology" with other terminology, which Applicant submits is in compliance with 35 U.S.C. 112, second paragraph.

Regarding claim 4, the Examiner wrote:

Claim 4 is rejected for phrase "substantially the same" as in claim 2 and also for the use of the relative terminology.

Applicant respectfully submits that the limitation in claim 4 containing the term "substantially" is sufficiently definite because one of ordinary skill in the art would know what is meant by "substantially the same," especially in view of the description in the specification. Please see section 2173.05(b) of the MPEP.

Applicant has amended claim 4, replacing the so-called "relative terminology" with other terminology, which Applicant submits is in compliance with 35 U.S.C. 112, second paragraph.

Regarding claims 5 and 6, the Examiner wrote:

> Amended claim 6 discloses limitation, "substantially immediately". Examiner is uncertain as to what metes and bounds (& distinction) between executing the catch-up mode when the virtual timer falls behind the physical computer timer "substantially immediately" and "predetermined amount". The "predetermined amount" limitation is present in claim 5.

Applicant respectfully submits that the limitation "substantially immediately" is sufficiently definite because one of ordinary skill in the art would know what is meant by "substantially immediately," especially in view of the description in the specification. Please see section 2173.05(b) of the MPEP.

Also, Applicant respectfully submits that there is nothing indefinite about a "predetermined amount." The fact that an amount is determined ahead of time does not make the amount indefinite.

Regarding claim 8, the Examiner wrote:

> The language presented after the phrase "based on the proportion..." is unclear as to what the actual time represents and if it has any relation to the time in the physical computer system.

Applicant has amended claim 8 to clarify this language. Applicant has also amended similar language in claims 22 and 29.

Regarding claim 9, the Examiner wrote:

> Examiner is unclear as there are many time indexes presented including "apparent time" as presented to the guest software running to virtual machine, time as present on the virtual machine indicated by the virtual timers and actual time. A clear distinction, in claims, as to what these 3 time values represent and who perceives them is required for clear understanding of the claims.

Applicant has amended claim 9 to clarify what is meant by "apparent time." In view of this amendment to claim 9, along with various other amendments related to time

in claim 3, Applicant submits that claim 9 now complies with 35 U.S.C. 112, second paragraph.

Regarding claim 11, the Examiner wrote:

> Claim 11 suffers from the same relative terminology rejection as presented in claim 1 and is rejected for the same reasons. Dependent claims are rejected likewise as well as they do not cure this deficiency.

Applicant has amended claim 11, replacing this so-called "relative terminology" with other terminology, which Applicant submits is in compliance with 35 U.S.C. 112, second paragraph.

Regarding claim 16, the Examiner wrote:

> Claim 16 suffers from the same deficiencies as presented in claim 2 and is rejected for the same reasons. Dependent claims are rejected likewise as well as they do not cure this deficiency.

Applicant has amended claim 16, replacing the so-called "relative terminology" with other terminology, which Applicant submits is in compliance with 35 U.S.C. 112, second paragraph. Based on the reasoning described above, in connection with claim 2, Applicant submits that claim 16, and the dependent claims that depend therefrom, are in compliance with 35 U.S.C. 112, second paragraph.

Regarding claims 17 and 18, the Examiner wrote:

> Claims represent relative and unclear limitations like "substantially proportional", and "substantially the same" whose metes and bounds are not clear. Please see rejection for claim 5 & 6 as these claims are rejected likewise.

Applicant respectfully submits that the limitations in claims 17 and 18 that include the term "substantially" are sufficiently definite because one of ordinary skill in the art would know what is meant by "substantially proportional" or "substantially the same,"

especially in view of the description in the specification. Please see section 2173.05(b) of the MPEP.

Regarding claim 19, the Examiner wrote:

> Claim 19 disclose limitation, "... goes behind the timing...". it is unclear which timing is being referred at this point (actual or virtual).

Applicant has amended claim 19 to clarify which timing is being referenced.

Regarding claim 20, the Examiner wrote:

> Claim 20 disclose limitation "substantially immediately" and is rejected as in claim 5.

Applicant respectfully submits that the limitation in claim 20 that includes the term "substantially" is sufficiently definite because one of ordinary skill in the art would know what is meant by "substantially immediately," especially in view of the description in the specification. Please see section 2173.05(b) of the MPEP.

Regarding claim 23, the Examiner wrote:

> Claim 23 is rejected for the same reasons as claim 1 due to relative terminology.

Applicant has amended claim 23, replacing this so-called "relative terminology" with other terminology, which Applicant submits is in compliance with 35 U.S.C. 112, second paragraph.

Regarding claim 24, the Examiner wrote:

> Claim 24 discloses the limitations, "apparent time is substantially the same as real time" and "apparent time is substantially behind the real time". It is unclear what would be the metes and bounds of these limitation to select one from another.

Applicant respectfully submits that the limitations in claim 24 that include the term "substantially" are sufficiently definite because one of ordinary skill in the art would know what is meant by "substantially the same" or "substantially behind," especially in view of the description in the specification. Please see section 2173.05(b) of the MPEP.

Regarding claim 25, the Examiner wrote:

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Claim 25 disclose limitation "substantially proportional"
and is rejected as in claim 17.
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Applicant respectfully submits that the limitation in claim 25 that includes the term "substantially" is sufficiently definite because one of ordinary skill in the art would know what is meant by "substantially proportional," especially in view of the description in the specification. Please see section 2173.05(b) of the MPEP.

Regarding claim 27, the Examiner wrote:

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Claim 27 disclose limitation "substantially immediately"
and is rejected as in claim 5.
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Applicant respectfully submits that the limitation in claim 27 that includes the term "substantially" is sufficiently definite because one of ordinary skill in the art would know what is meant by "substantially immediately" especially in view of the description in the specification. Please see section 2173.05(b) of the MPEP.

The Examiner has also rejected claim 8 under 35 U.S.C. 112, second paragraph, stating that claim 8 recites the limitation "the actual time." The Examiner further writes that there is insufficient antecedent basis for this limitation in the claim. Claim 8 has been amended and no longer includes the limitation "the actual time."

Applicant respectfully submits that all of the claims, as amended herein, are in compliance with 35 U.S.C. 112, second paragraph.

Claim Rejections

Rejections Under 35 U.S.C. 102

The Examiner has rejected claims 1, 9-15, 21-23 and 28-29 under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,349,388, with an inventor of Russell (hereinafter "Russell"). Russell discloses a "timer processing engine," which supports multiple virtual timers, based on the timing of a single free running counter.

Regarding claim 1, the Examiner wrote:

> A method for emulating a plurality of virtual timers in a virtual computer system, the virtual timers being programmable by guest software to generate a plurality of timer events (Russell: Abstract), the method comprising: receiving programming information from the guest software for programming a first virtual timer (Russell: Col.5 Lines 48-Col.6 Line 13; Fig.3); receiving programming information from the guest software for programming a second virtual timer (Russell: Col.5 Lines 48- Col.6 Line 13; Fig.3); determining when the first virtual timer would generate timer events if it were implemented in a physical computer system, based on the programming information received from the guest software (Russell: Fig.3 Col. 3 Terminal time value where each row represents a timer); determining when the second virtual timer would generate timer events if it were implemented in a physical computer system, based on the programming information received from the guest software (Russell: Fig.3 Col. 3 Terminal time value where each row represents a timer); and generating timer events for the first virtual timer and the second virtual timer in the same combined sequence that they would occur if the first and second virtual timers were implemented in a physical computer system (Russell: Col.5 Lines 42-47 Fig. 2 Element 210 being initiated).

Applicant has amended claim 1 to add the following limitation: "wherein the generation of timer events falls behind the real time, so that a first plurality of timer events, including one or more timer events of the first virtual timer and one or more timer events of the second virtual timer, are set to have already occurred according to the real time, but the first plurality of timer events have not yet occurred in the virtual computer system." Applicant submits that Russell does not disclose having the generation of timer events fall behind the real time, as described in this limitation.

Accordingly, Applicant submits that claim 1, as amended, is patentable over the prior art of record.

Regarding claim 9, the Examiner wrote:

> Russell teaches that the method is performed by keeping track of an apparent time, which represents the time as it would appear to the guest software (Russell: Fig. 2 - Elapsed time value).

Applicant has amended claim 9 to depend from claim 3, which the Examiner has indicated is allowable. Accordingly, Applicant submits that claim 9, as amended, is patentable over the prior art of record.

Regarding claim 10, the Examiner wrote:

> Russell teaches that the method is performed using a timer event queue (Russell: Col.6 Lines 20-38).

Applicant has also amended claim 10 to depend from claim 3, which the Examiner has indicated is allowable. Accordingly, Applicant submits that claim 10, as amended, is patentable over the prior art of record.

Regarding claim 11, the Examiner wrote:

> Claim 11 discloses similar limitations as claim 1 and is rejected for the same reasons. Claim 11 discloses a computer program embodied in a tangible medium, which is mapped to the timer state machine (program) and the associated timers embodied in a tangible medium (memory).

Applicant has amended claim 11 to add the following limitation: "wherein the generation of timer events falls behind the real time, so that a first plurality of timer events, including a timer event from each of at least two of the virtual timers, are set to have already occurred according to the real time, but the first plurality of timer events have not yet occurred in the virtual computer system." Applicant submits that Russell does not disclose having the generation of timer events fall behind the real time, as described in this limitation. Accordingly, Applicant submits that claim 11, as amended, is patentable over the prior art of record.

Regarding claims 12 and 13, the Examiner wrote:

> Claims 12 and 13 disclose similar limitations as claim 10 are rejected for the same reason as claim 10.

Claims 12 and 13 depend from claim 11. Therefore, Applicant submits that claims 12 and 13 are patentable over the prior art of record for the same reason as described above relative to claim 11.

Regarding claims 14 and 15, the Examiner wrote:

> Russell teaches timer event queue maintains a single time value for each of the plurality of virtual timers, representing a time at which the respective virtual timer should generate its next timer event as timer states in link list in the time-out order (or next timer event) (Russell: Col.6 Lines 20-38).

Claims 14 and 15 also depend from claim 11. Therefore, Applicant submits that claims 14 and 15 are also patentable over the prior art of record for the same reason as described above relative to claim 11.

Regarding claim 21, the Examiner wrote:

> Russell teaches if a software entity attempts to read a count value from a virtual timer, the time coordinator provides a value to one of the timer emulators, which causes the timer emulator to return a count value to the software entity that represents a time value that occurs after a time value that is represented by a most recent preceding timer event and before a time value that is represented by a next timer event to occur (Russell: Col.5 Lines 28-40; CoI.6 Lines 38-48).

Applicant has amended claim 21 to depend from claim 16, which the Examiner has indicated is allowable. Accordingly, Applicant submits that claim 21, as amended, is patentable over the prior art of record.

Regarding claim 22, the Examiner wrote:

> Russell teaches the time value that is represented by the count value that is returned to the software entity falls proportionately between the time value that is represented by the most recent preceding timer event and the time value that is represented by the next timer event to occur, based on the proportion at which the time of the attempted reading of the count value falls between the actual time that the most recent preceding timer event was generated and the actual time that the next timer event is scheduled to be generated as proportional to the actual time because actual time is represented by the free running counter (Russell: Fig.2 Element 202).

Claim 22 depends from claim 21, which has been amended to depend from claim 16, which the Examiner has indicated is allowable. Accordingly, Applicant submits that claim 22 is patentable over the prior art of record.

Regarding claim 23, the Examiner wrote:

> Russell teaches a method for coordinating a plurality of virtual timers in a virtual computer system, the virtual computer system operating within a physical computer system (Russell: Abstract), the method comprising: receiving programming information for each of the virtual timers, indicating when each of the virtual timers is to generate timer events; determining when each of the virtual timers would generate timer events if the virtual timers were implemented in a physical computer system (Russell: Col.5 Lines 48-Col.6 Line 13; Fig.3); and causing the virtual timers to generate timer events in the same combined sequence as if the virtual timers had been implemented in a physical computer system (Russell: Fig.3 Col. 3 Terminal time value where each row represents a timer; Russell: Col.5 Lines 42-47 Fig. 2 Element 210 being initiated).

Applicant has amended claim 23 to add the following limitation: "wherein the virtual timers fall behind the real time, so that a first plurality of timer events, including a timer event from each of at least two of the virtual timers, are set to have already occurred according to the real time, but the first plurality of timer events have not yet occurred in the virtual computer system." Applicant submits that Russell does not disclose having the generation of timer events fall behind the real time, as described in

this limitation. Accordingly, Applicant submits that claim 23, as amended, is patentable over the prior art of record.

Regarding claims 28 and 29, the Examiner wrote:

> Claims 12 and 13 disclose similar limitations as claim 21 & 22 are rejected for the same reason as claims 21 & 22.

Applicant has amended claim 28 to depend from claim 24, which the Examiner has indicated is allowable. Claim 29 depends from claim 28. Accordingly, Applicant submits that claims 28 and 29, as amended, are patentable over the prior art of record.

Allowable Subject Matter

The Examiner has indicated that claims 2-8, 16-20 and 24-27 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, and to include all of the limitations of the base claim and any intervening claims. Claims 2, 3, 16 and 24 have been amended to include all of the limitations of the corresponding base claim and any intervening claims. Assuming Applicant has successfully overcome or traversed all of the rejections under 35 U.S.C. 112, second paragraph, claims 2, 3, 16 and 24 should now be allowable. Applicant has also amended other dependent claims to depend from claims 3, 16 and 24, so that these dependent claims should also be allowable.

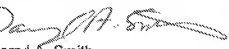
During this Amendment, Applicant noticed that claims 2 and 3, prior to this Amendment, were identical to one another. After entering this Amendment, however, claims 2 and 3 are substantially different from one another. Claim 2 corresponds more closely with the scope of claim 1, as amended herein, while claim 3 corresponds more closely with the scope of claim 1 as originally submitted.

Conclusion

The various embodiments of the applicant's invention as defined in the various independent claims recite features that are not found at all in any of the cited references, whether the references are viewed independently or in combination. Accordingly, applicant submits that the independent claims are allowable over the cited prior art. The various dependent claims, of course, simply add additional limitations and should therefore be allowable along with their respective independent base claims. Applicant requests reconsideration of this application.

Date: 31 December 2007

Respectfully submitted,



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